



— 2025 —

DEBATES AND DIDACTICS
in **Hematology**
and **Oncology**



Where **Science** Becomes **Hope**

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Should I Use AI to Improve Efficiency in the Clinic? Opportunities and Pitfalls

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Disclosures

Consultant/Advisor/Speaker:

Main Street Health, Mendei ai, Onc ai, Optinosis, Thyme Care

Objectives

- Define artificial intelligence and related concepts
- Identify use cases of AI in oncology treatment decision-making and clinical decision-support
- Recognize ethical and practical challenges surrounding the use of AI
- Discuss next steps to facilitate responsible use of AI within health care settings

Definitions

Artificial intelligence (AI): Pattern recognition from large datasets.¹

Autonomous AI: Operates independently without human oversight.

Assistive AI: Supports users by providing information, suggestions, or assistance in completing tasks.

Generative AI: Create new content rather than analyzing or categorizing existing information

Large Language Models: Processing and generating human-like text

Ambient AI: Systems that operate unobtrusively in the background.

A Tale of Two Treatment Timelines

67 male smoker...

- 2014-2016: 2 LDCT scans → *lung nodule identified but not followed*
- 2018: New pain → *Widespread adenopathy. Biopsy = CA of unknown primary*
- Repeat biopsy → *Poorly differentiated CA of lung origin*
 - PD-L1 negative → *Platinum doublet + ICI*
 - 2019: Oligometastatic recurrence → *Chemoradiation*
 - 2020: Frank progression → *Clinical trial*

A Tale of Two Treatment Timelines

67 male smoker...

- 2010-2012: 2 LDCT scans → *lung nodule identified but not followed*

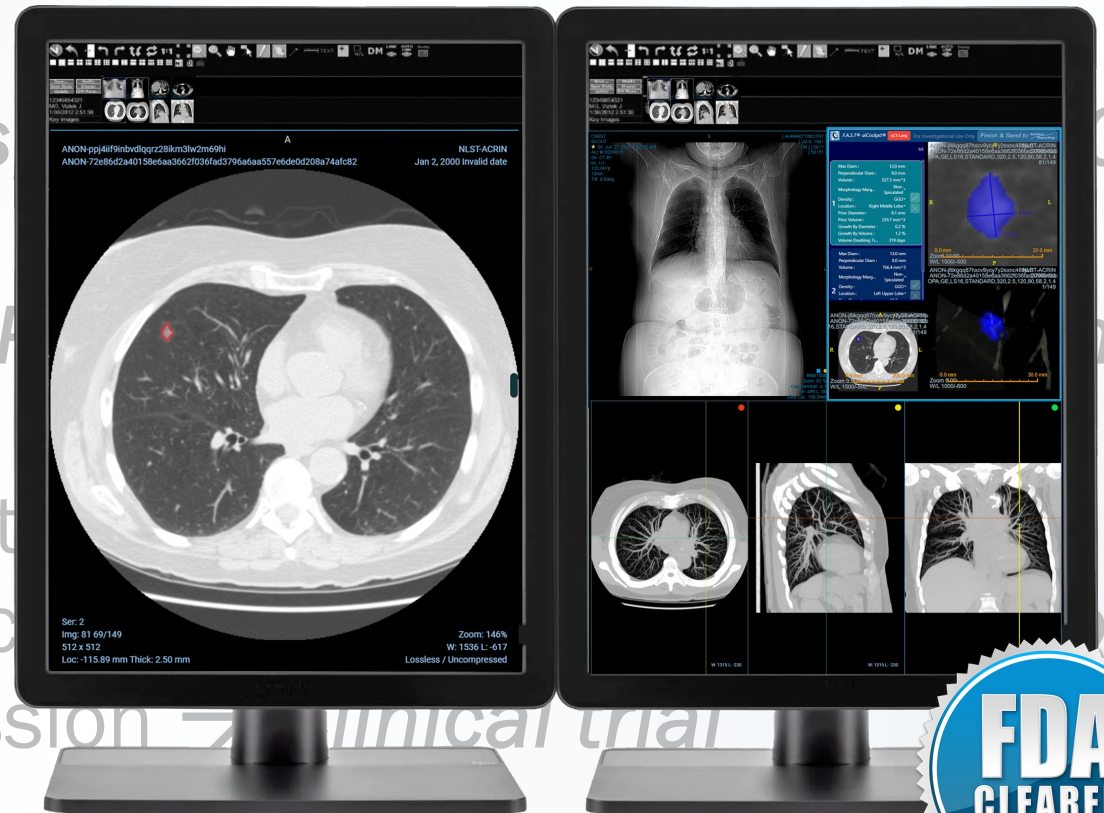
- 2015: New pain → *Widespread metastatic disease of unknown primary*

2 years saved

- Late 2016: PD-L1 negative

- 2018: Oligometastatic

- 2020: Frank progression → *clinical trial*



A Tale of Two Treatment Timelines

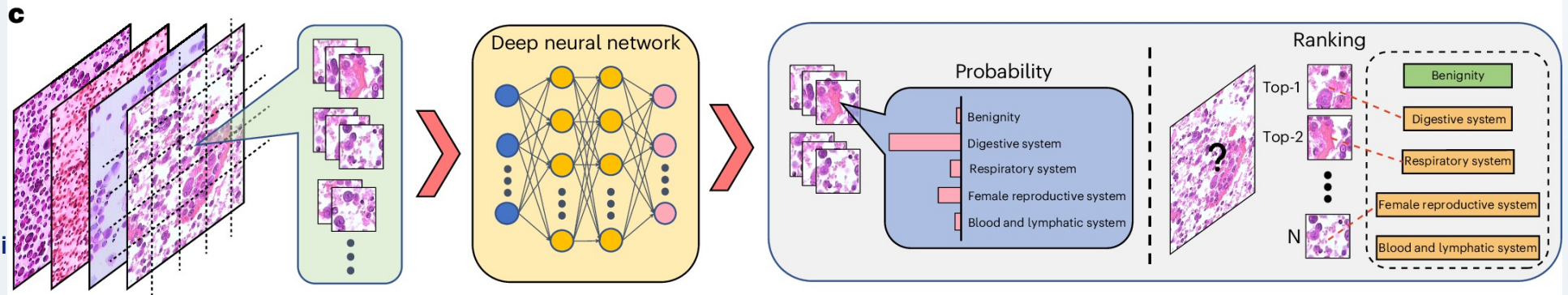
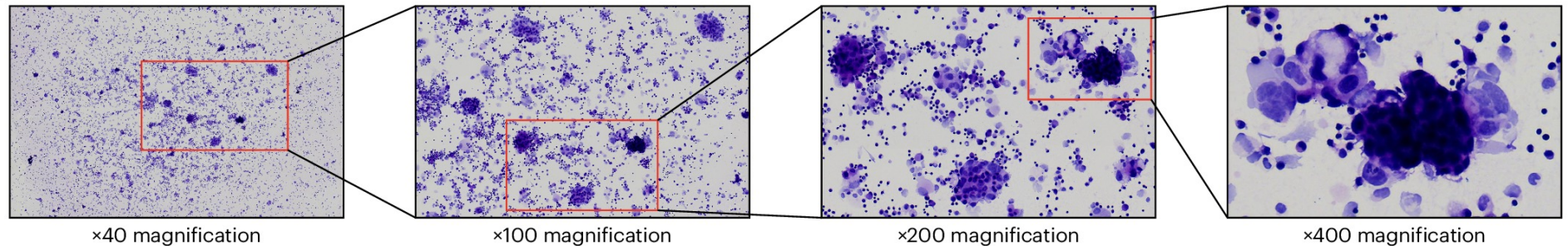
67 male smoker...

3 months saved

• 2010-2012: 2 LDCT scans → lung nodule

- 2015: New pain → *Widespread adenopathy. Biopsy = CA of unknown primary*
- 2016: Repeat biopsy → *Poorly differentiated CA of lung origin*

- Late 2016: PD
- 2018: Olig
- 2020:



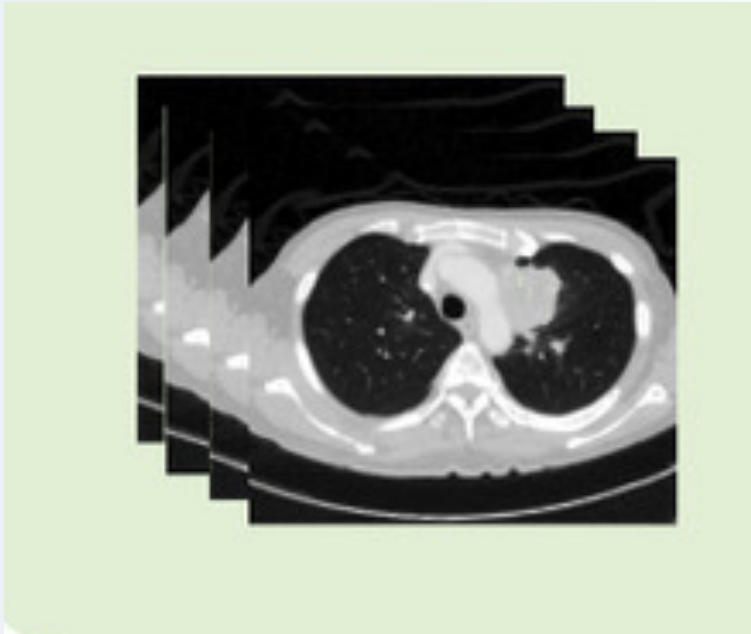
A Tale of Two Treatment Timelines

67 male smoker...

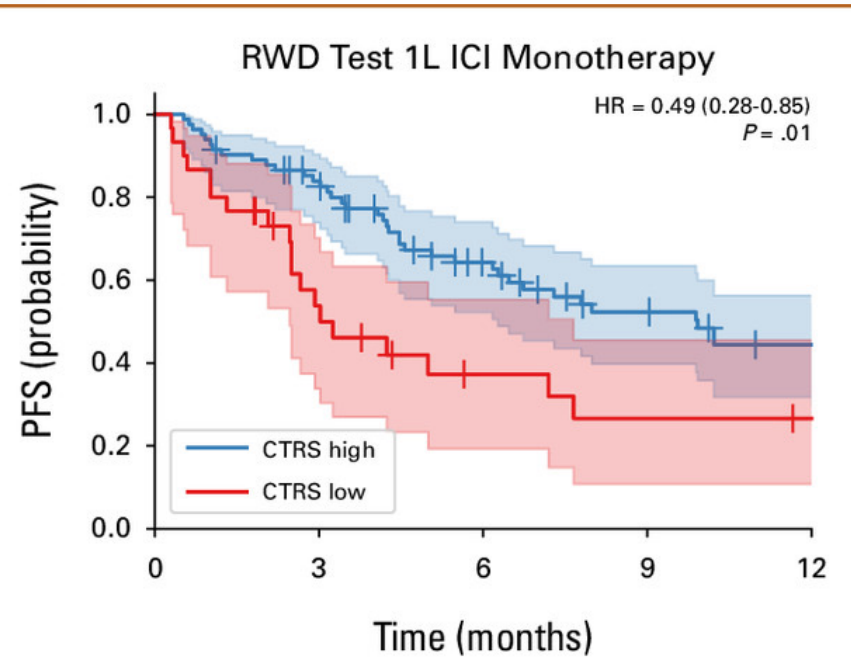
2-3 weeks saved

- 2010-2012: 2 LDCT scans → lung nodule identified but not f
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inica



A Tale of Two Treatment Timelines

67 male smoker...

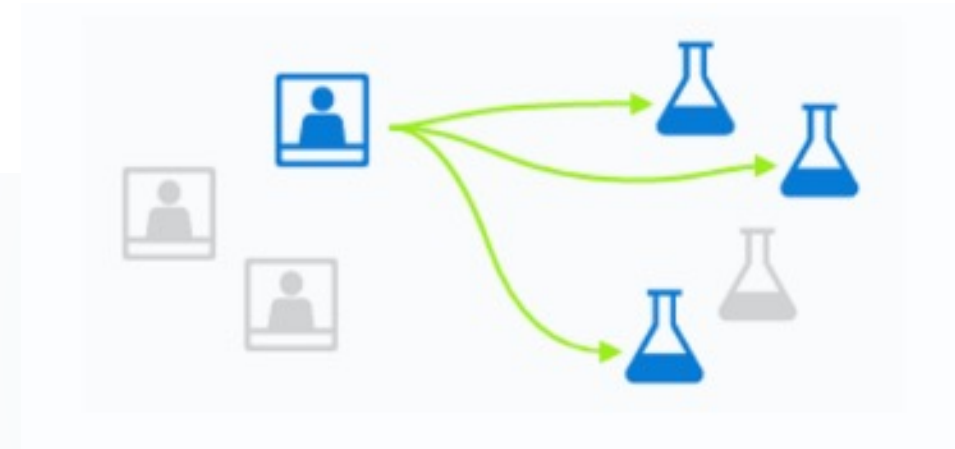
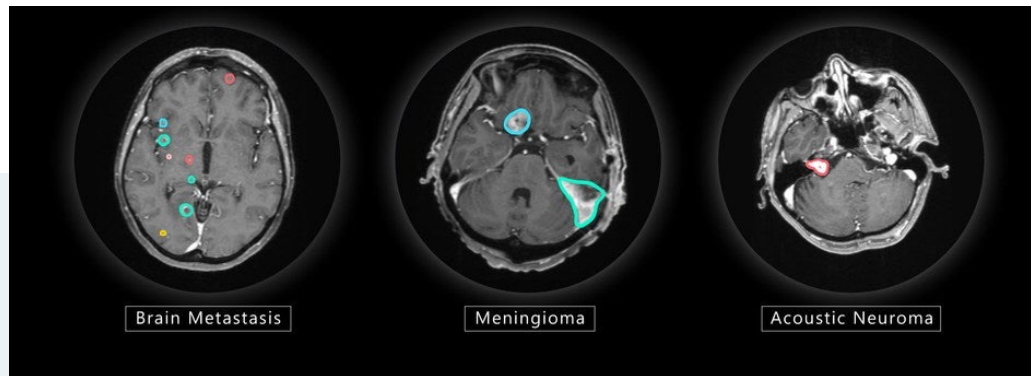
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Weeks saved

- **2018:** Oligometastatic recurrence → *Chemoradiation*
- **2020:** Frank progression → *Clinical trial*

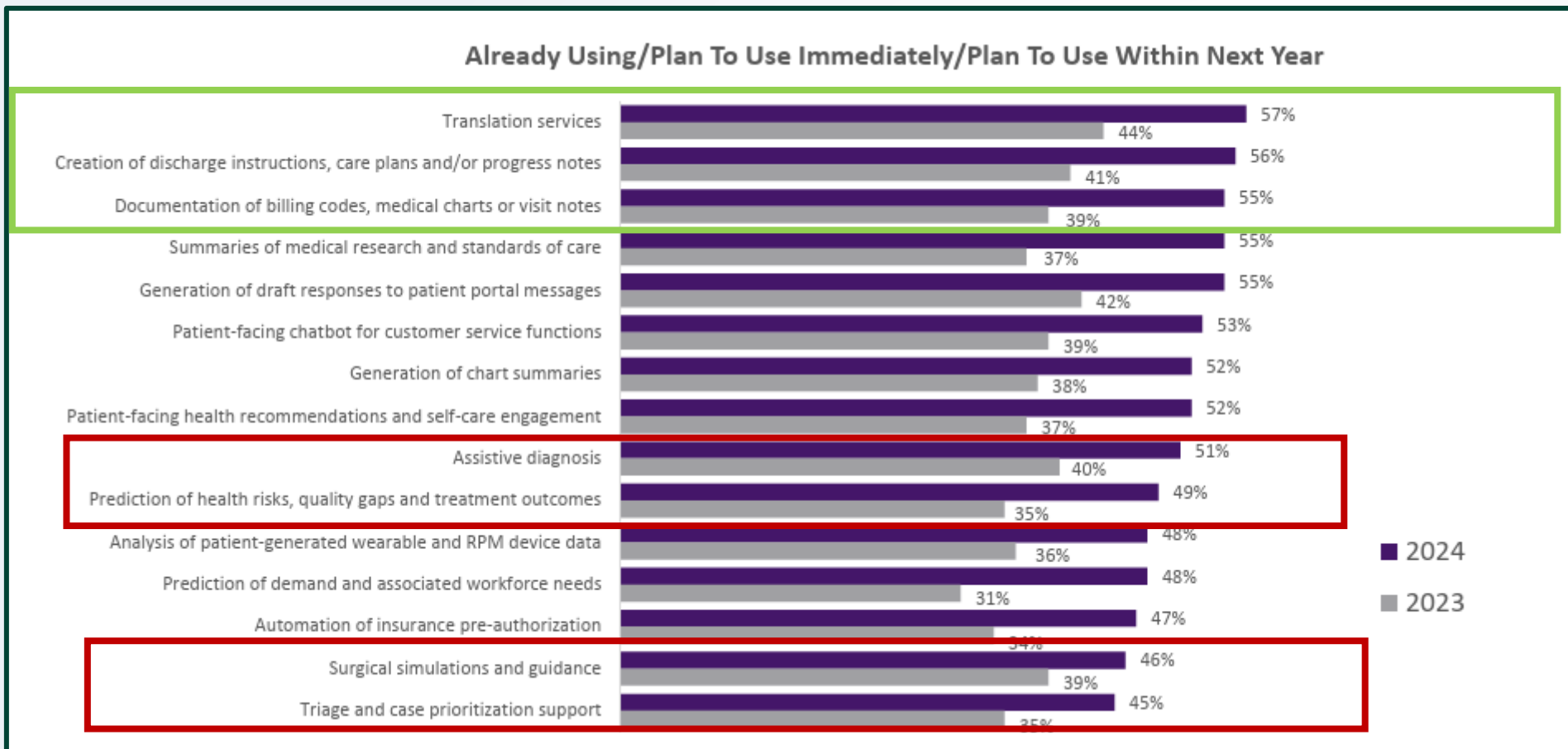
FDA Clears Tumor Auto-contouring Solution for Radiation Therapy

Published Date: April 6, 2021



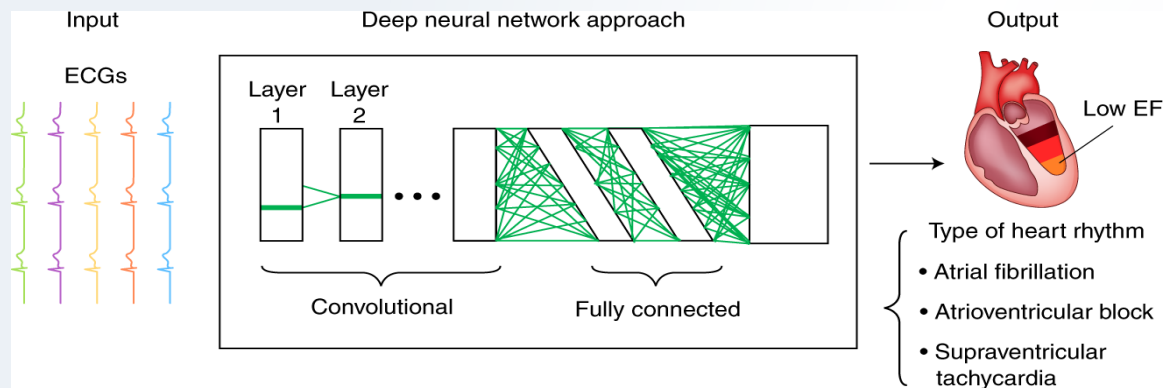
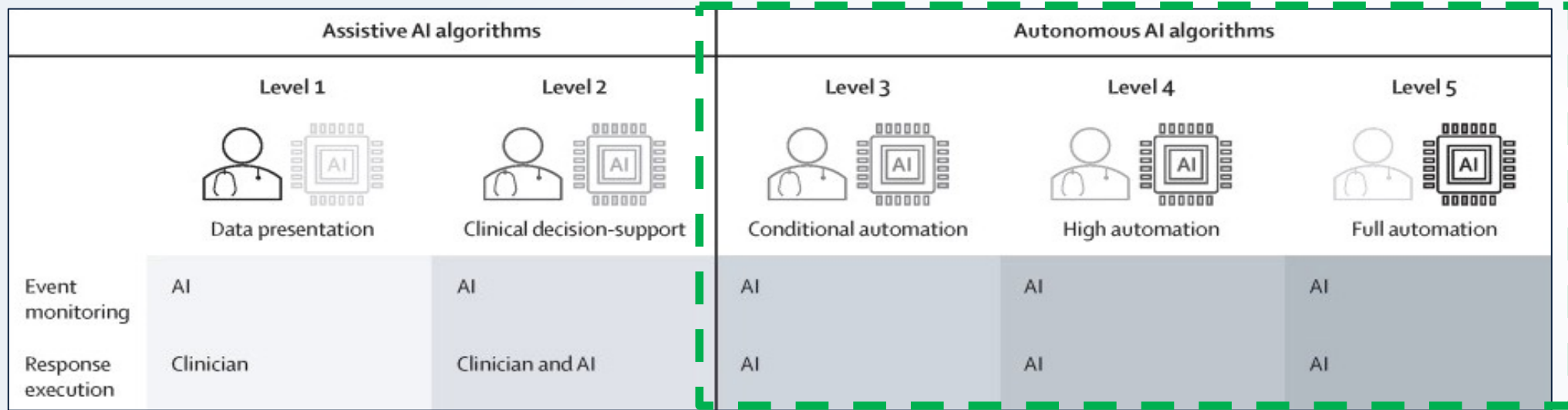
Unlu et al, JAMA 2025

Many doctors still lag in utilizing AI



American Medical Association 2025





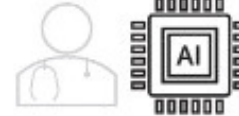
We pretend like all AI is autonomous...



What Matters for Autonomous AI?

Accuracy

...when instead most current AI is assistive

Assistive AI algorithms			Autonomous AI algorithms		
	Level 1	Level 2	Level 3	Level 4	Level 5
					
	Data presentation	Clinical decision-support	Conditional automation	High automation	Full automation
Event monitoring	AI	AI	AI	AI	AI
Response execution	Clinician	Clinician and AI	AI	AI	AI

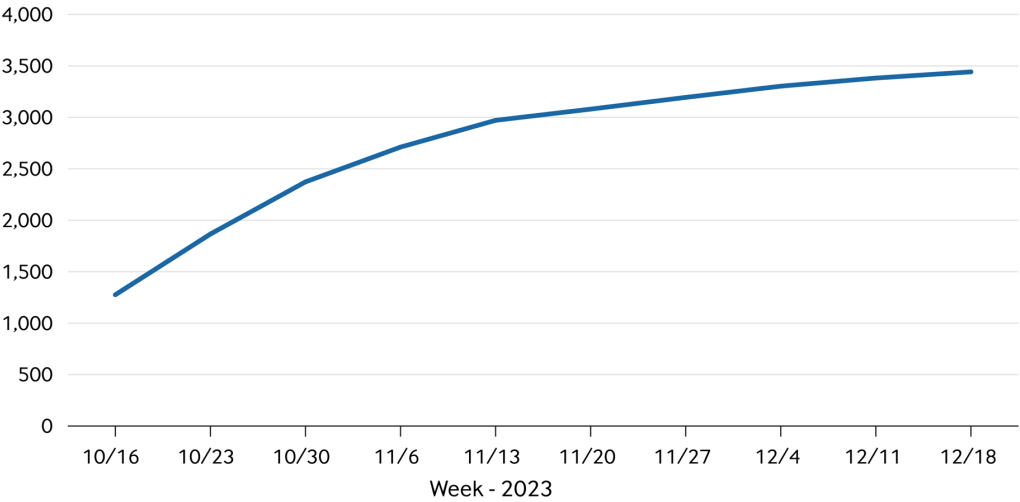


What Matters for *Assistive* AI?

Trust

The ambient scribing revolution

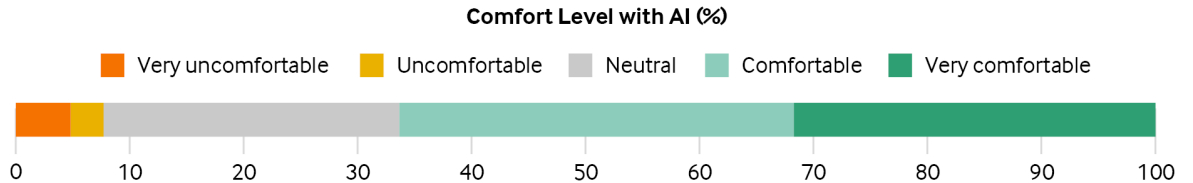
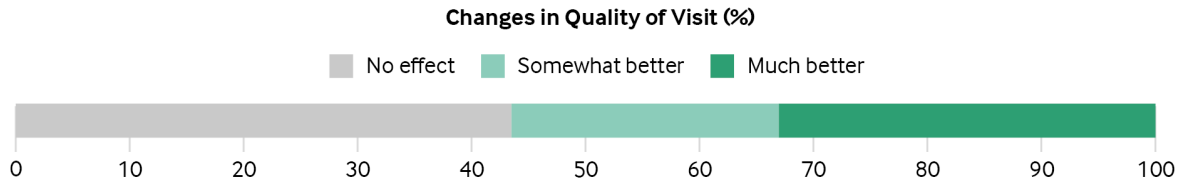
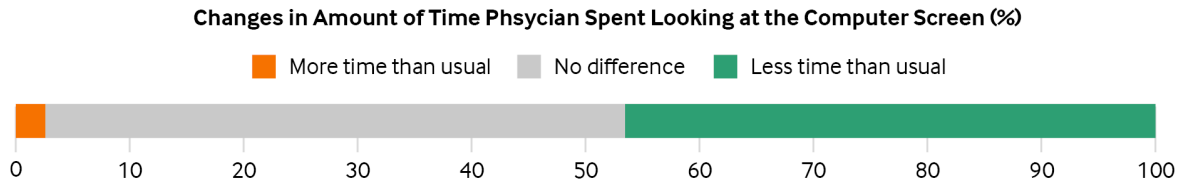
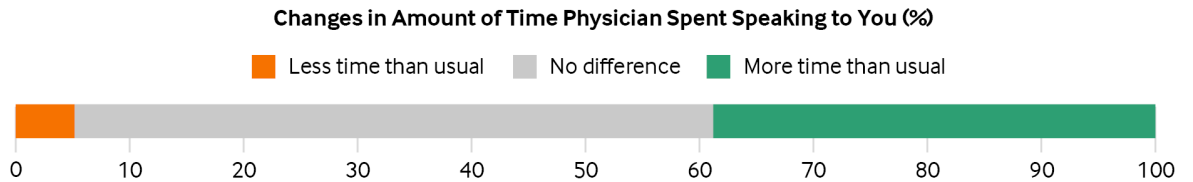
Panel A. Unique Physicians Ever Using AI Scribe



Tierney et al, NEJM Catalyst, 2025

Patient Responses to Changes in Their Visit Due to the Use of an AI Scribe

These charts show patient responses in percentages for changes in the amount of time the physician spent speaking to the patient (less time than usual, no difference, more time than usual); changes in the amount of time the physician spent looking at the computer screen (more time than usual, no difference, less time than usual); changes in the quality of the visit (no effect, somewhat better, much better); and physician comfort level with AI (very uncomfortable, uncomfortable, neutral, comfortable, very comfortable).



Source: NEJM Catalyst
NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Automated inbox responses

GenAI-drafted reply (103 words)

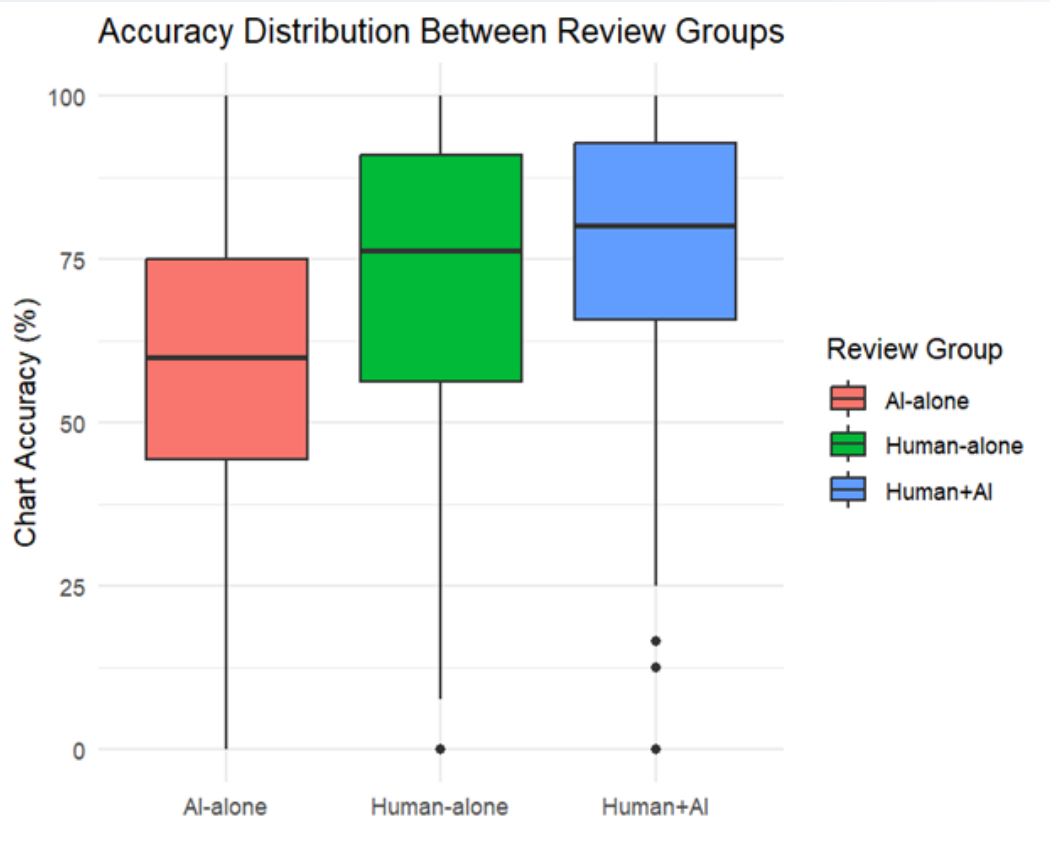
Hello [patient name], I'm glad to hear that your knee pain has improved on its own. Regarding your elbow pain, it's important that we discuss your symptoms and evaluate the best course of action. It may be necessary to consider an x-ray or a referral for physical therapy, but we can determine that during your appointment on [date]. As for your test results, no results are available at this time. When results become available, you can view them in MyChart under the "Test Results." If you have any further concerns or questions, please don't hesitate to schedule an additional appointment to discuss them in person. Sincerely, [name of Epic employee] Part of this message was generated automatically and was reviewed and edited by [name of Epic employee].

Physician reply (59 words)

Hello [patient name], I'm glad to hear that your knee pain has improved on its own. Regarding your elbow pain, unless you had an acute injury like a fall or an impact, it is unlikely that the x-rays will show very much. I would much prefer you make or keep the [date] appointment for a good examination before exposing you to x-rays. Best regards, [physician name], MD [Signature Derived From Controlled Access Password] Part of this message was generated automatically and was reviewed and edited by [physician name, MD].

Greater length of reply – whether from AI or physician – is associated with greater patient satisfaction

Prescreening for clinical trials



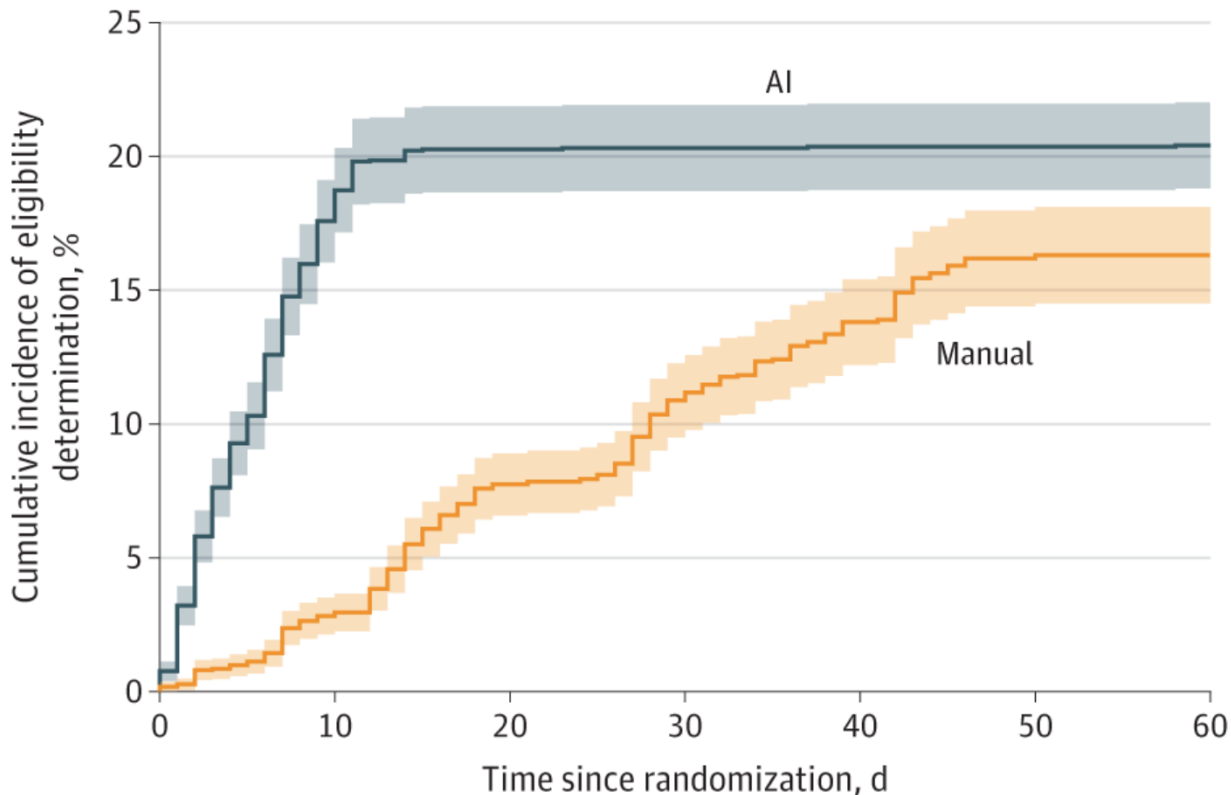
	Criteria	Accuracy (%)		
		Human-Alone	Human + AI	AI-Alone
Biomarker	Was Biomarker Tested?	84.6	93.2	88.1
	Categorical Value	67.9	79.0	32.5
	Interpretation	80.8	91.3	35.7
Neoplasm	Cancer Type	86.9	86.4	73.3
	Stage Group	71.7	73.4	57.0
	M Stage	43.9	57.0	60.2
	N Stage	50.5	66.3	52.6
	T Stage	56.3	71.6	54.3
Other	Outcome	23.7	35.9	55.2
	Response	47.1	51.7	60.4
	ECOG Status	84.7	78.1	34.4
	Medication			
	Concept	89.0	89.1	59.4

Parikh et al, ASCO, 2025

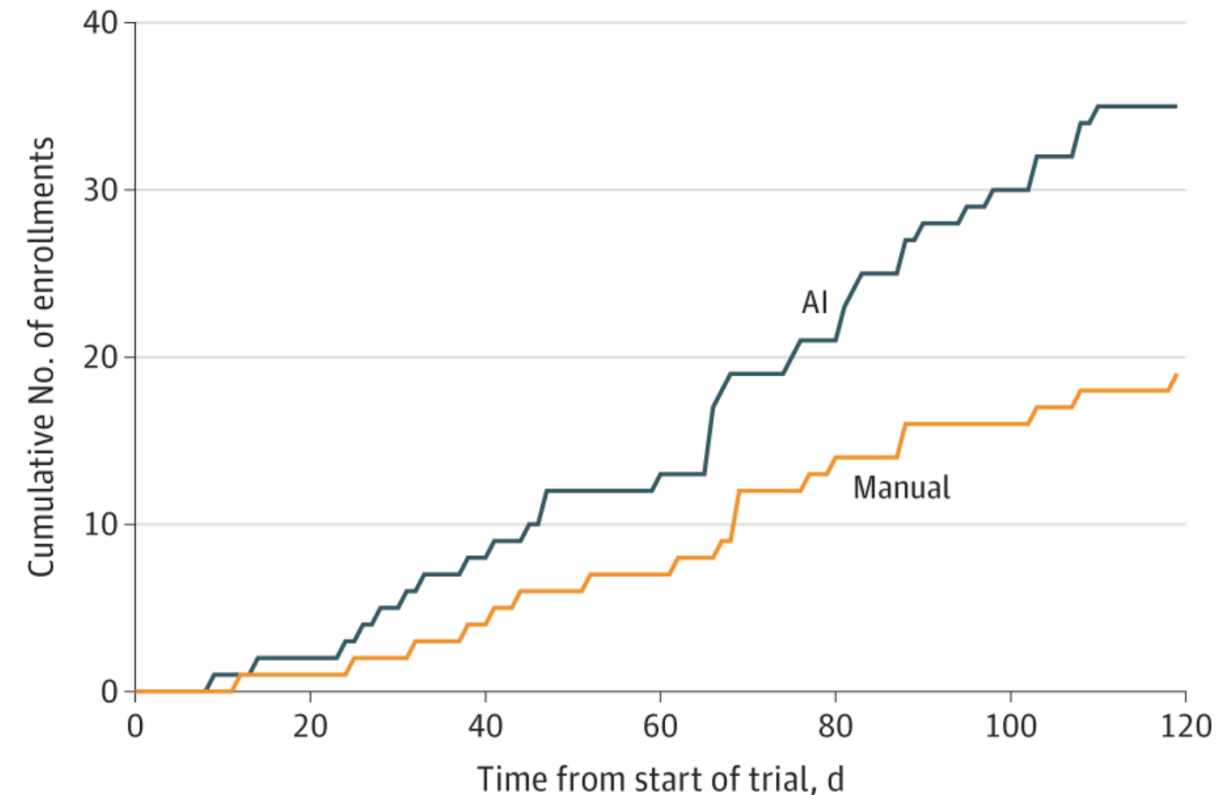
Prescreening for clinical trials

Randomized clinical trial of Manual vs AI-Assisted Clinical Trial Screening Using Large-Language Models

A Cumulative incidence of eligibility determination

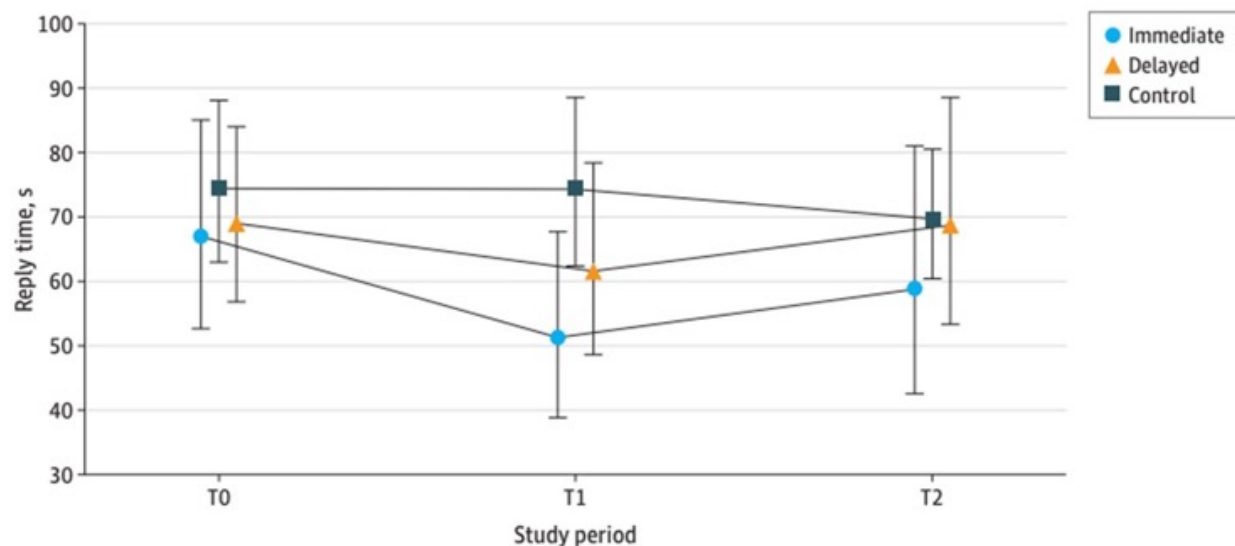


B Cumulative No. of enrollments over time



The perils of non-trustworthy AI

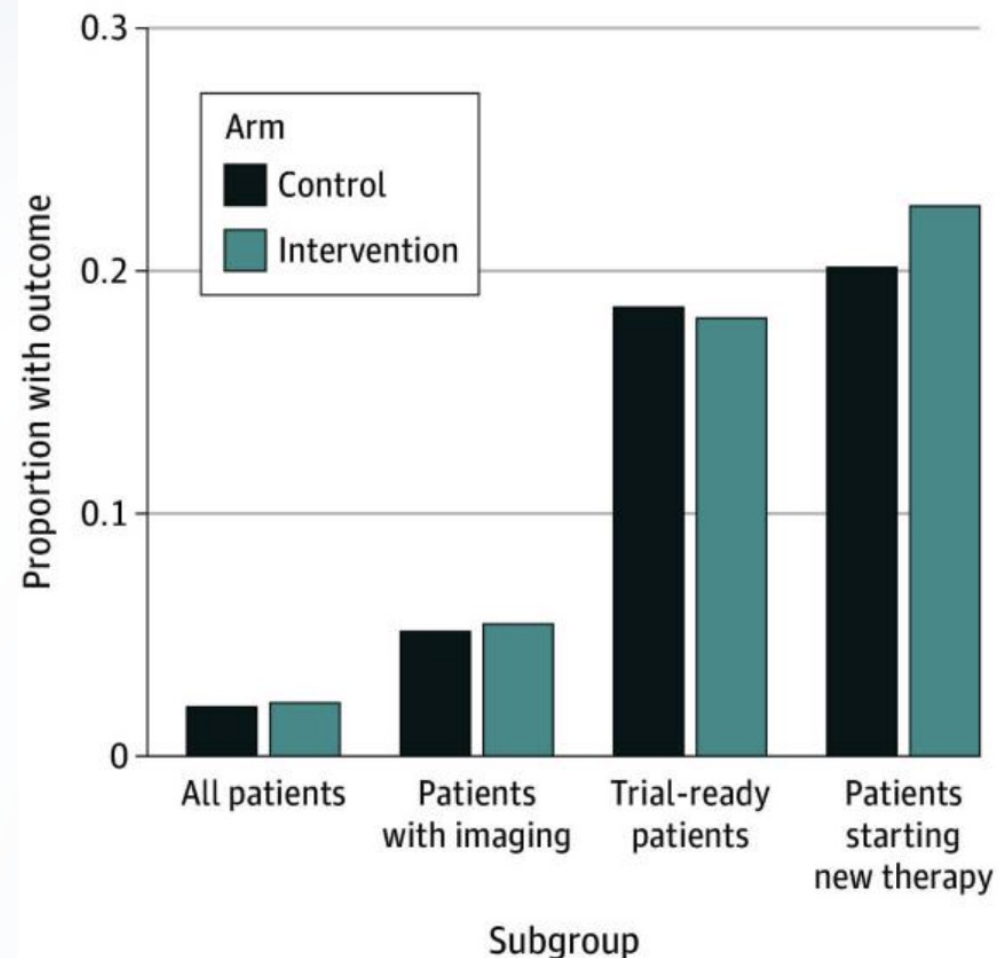
Figure 2. Reply Time per Message (in Seconds) for Each Group and Study Period



AI patient responses did not save time for clinicians

Tai-Seale et al, JAMA Netw Open 2024

A Enrollment rate

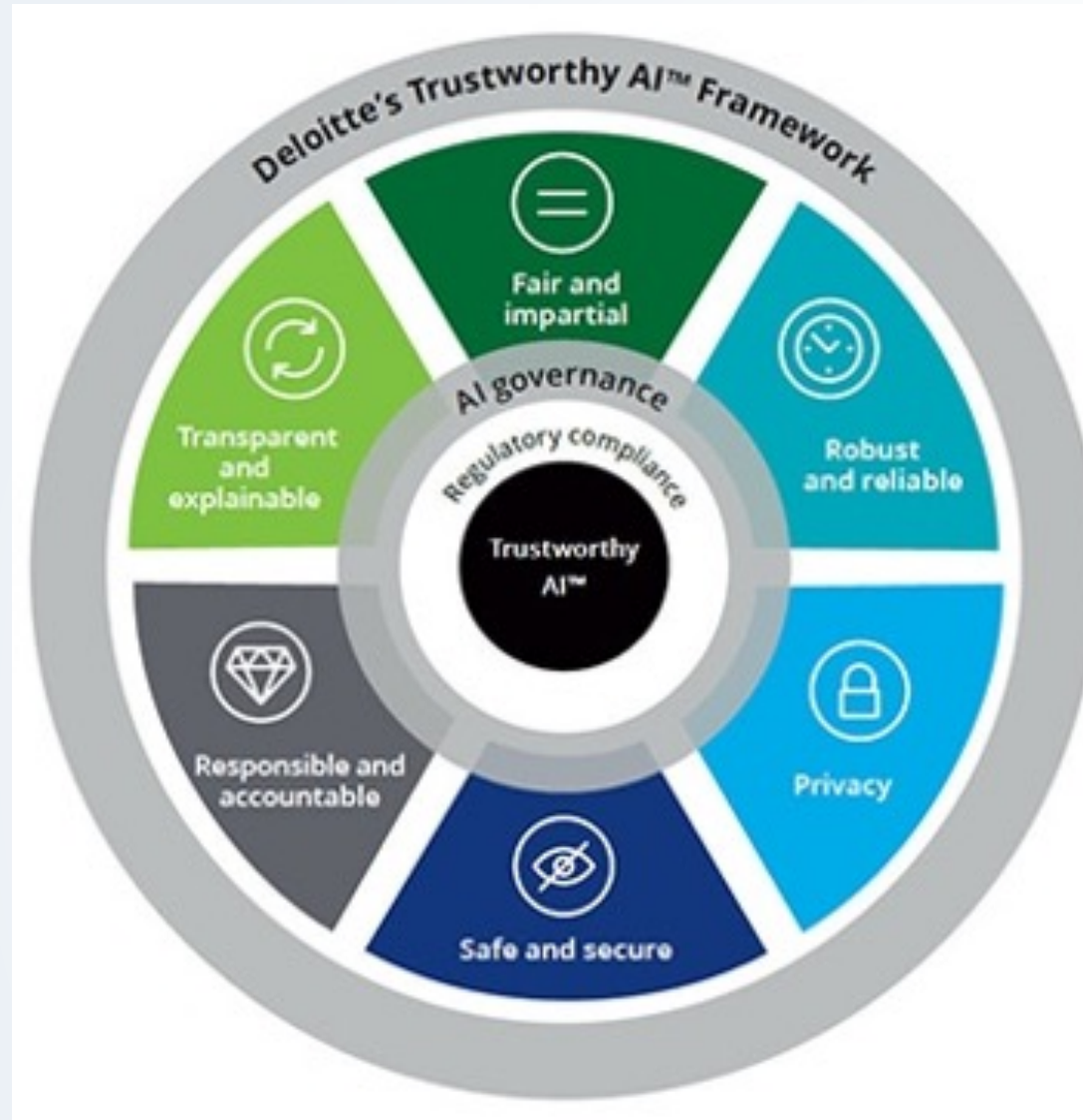


AI detection of progression with matched trials did not increase enrollment

The need for better fine-tuned models in oncology



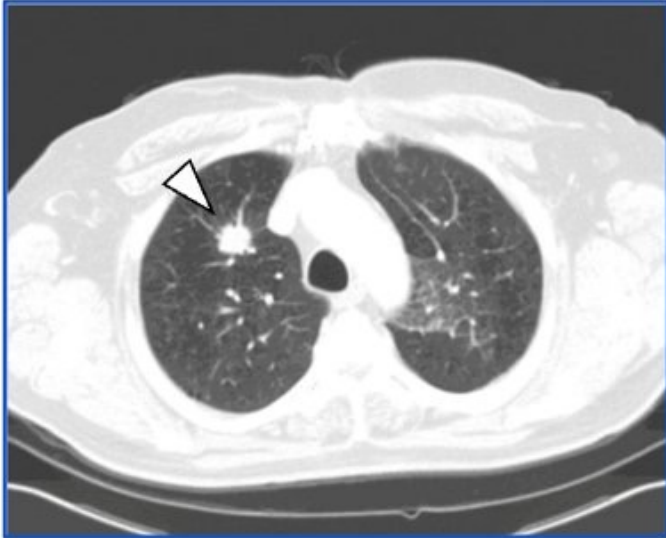
What will it take to trust AI in our clinic?



Explainable AI

Prompt:

Write a radiology report for this image as an expert radiologist..



GPT-4V:

Report:

Date: 6/25/2021

Study Type: Chest CT

Subject: 42-year-old male

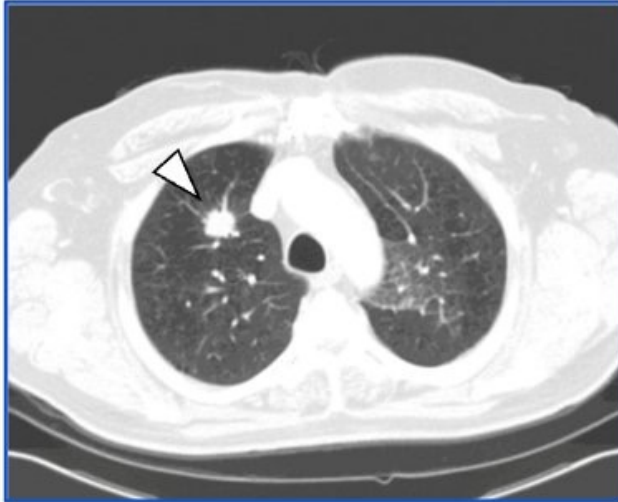
Findings: The chest CT images demonstrate a nodular opacity in the left upper lobe, measuring approximately 1.3 cm in diameter. The opacity appears to have spiculated margins and is located adjacent to the pleura. There is no evidence of mediastinal or hilar lymphadenopathy.

Impression: The findings are concerning for a primary lung malignancy. Further evaluation with a biopsy is recommended to confirm the diagnosis.

When explainability goes wrong...

Prompt:

Write a radiology report for this image as an expert radiologist..



GPT-4V:

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Impression: The findings are concerning for a primary lung malignancy. Further evaluation with a biopsy is recommended to confirm the diagnosis.

Evaluation from Professionals:

Correct study type and identification

Mentions nodule but in the left rather than in the right.

Gives measurements (hallucination)

Yang et al, arXiv, 2023, "The Dawn of LMMs: Preliminary Explorations with GPT-4V(ision)"

Source: arXiv/2309.17421

Bias in AI Algorithms

Biased data generation → biased algorithms

Likelihood of genetic testing among African-American women with breast cancer

Analysis	Odds Ratio (95% CI)
Overall	0.40 (0.34-0.48)
Adjusted for mutation risk	0.66 (0.53-0.81)
Adjusted for physician recommendation	0.76 (0.57-1.02)

“The presence of a laboratory test order, regardless of any other information about the test result, has a significant association ($P<0.001$) with the odds of survival in 233 of 272 (86%) tests. ”

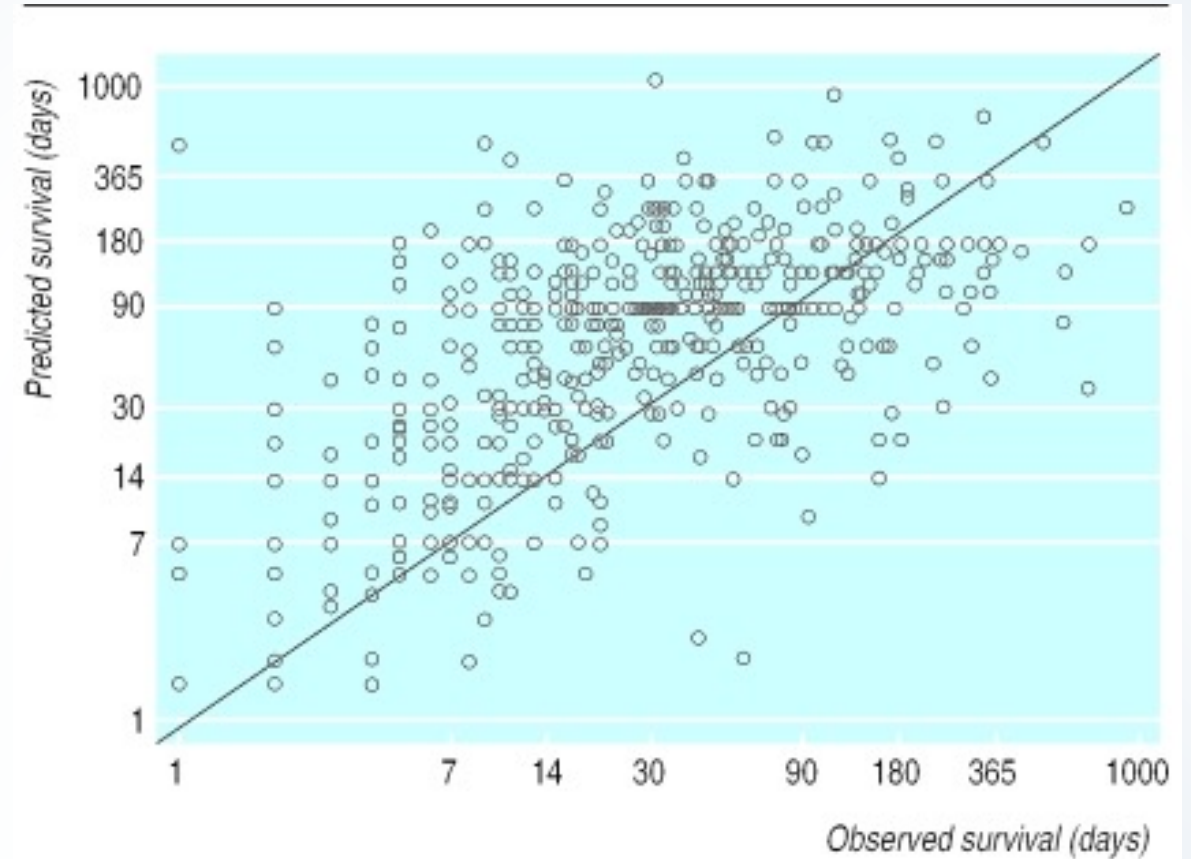
McCarthy et al, J Clin Oncol, 2016; 34 (22): 2610-2618; Agniel et al, BMJ, 2018;361:k1479

The background features a light blue gradient with large, overlapping white and light blue circular shapes. On the left, there is a faint image of a lighthouse on a rocky island. A large, colorful, abstract shape, resembling a stained-glass window or a microscopic view of cells, is positioned in the upper left quadrant.

An Implementation Roadmap for AI

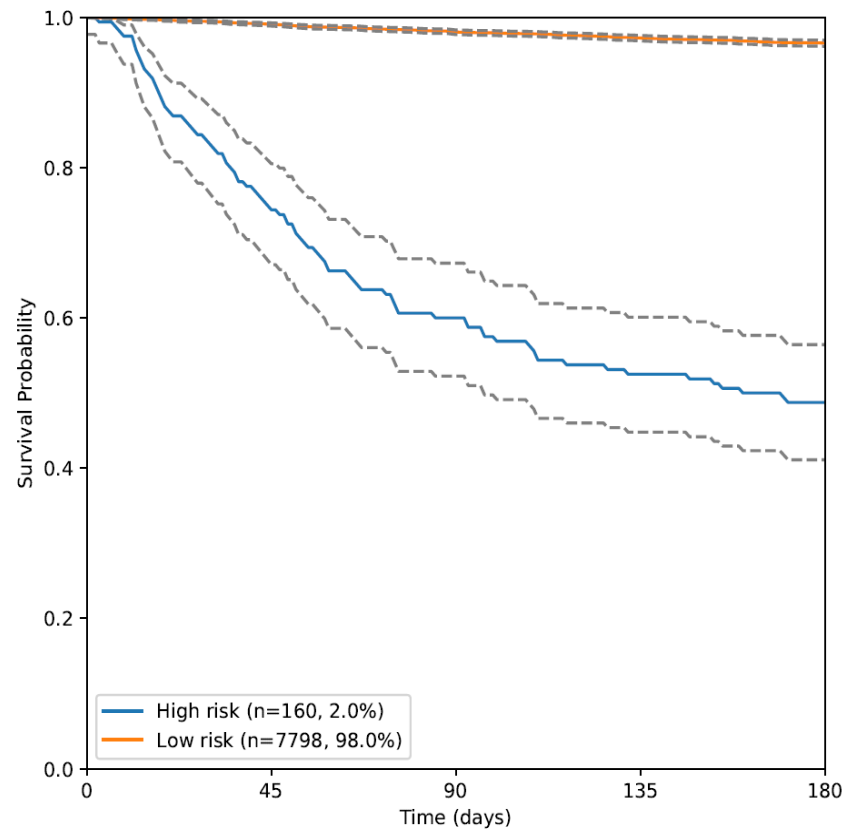
Use Case: Serious Illness Communication

- Early communication is key to reducing oncology patient experience
 - Reduced end-of-life utilization
 - Reduced anxiety and depression
 - Improved caregiver satisfaction
- Identifying appropriate patients is key, but there is a lack of clarity in prognosis
 - Oncologists overestimate survival by **5.4x**



Christakis and Lamont, BMJ, 2000; Levoy et al, Journal of Pain and Symptom Management, 2023

Month 1-3: Developing and Piloting the Algorithm



Clinician perspectives on machine learning prognostic algorithms in the routine care of patients with cancer: a qualitative study

Original Investigation | Oncology
Machine Learning Approaches to Predict 6-Month Mortality Among Patients With Cancer

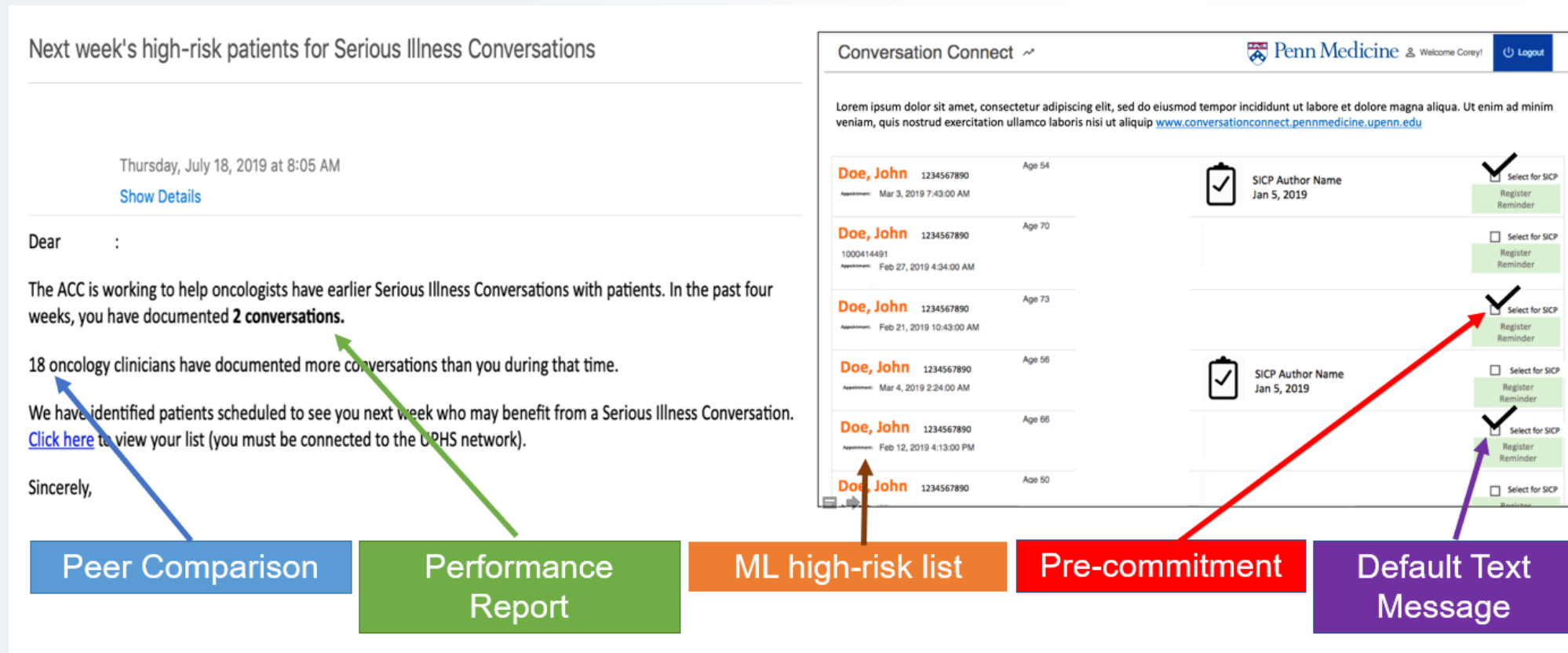
JAMA Oncology | Original Investigation
Validation of a Machine Learning Algorithm to Predict 180-Day Mortality for Outpatients With Cancer

Variables	Examples	Features
Demographics	Age, Gender	
Comorbidities	33 Elixhauser comorbidities	<ul style="list-style-type: none">Total countRecent*
Cancer-specific	Stage, tumor markers	<ul style="list-style-type: none">Total countFirst/last valueMin/MaxProportion ordered
Laboratories	CMP, CBC, LDH	STAT
Recent utilization	Outpatient visit number	

Parikh RB, et al. *Support Care Cancer*. 2022;30(5):4363-4372. 2. Parikh RB, et al. *JAMA Netw Open*. 2019;2(10):e1915997. 3. Manz CR, et al. *JAMA Oncol*. 2020;6(11):1723-1730.

Month 3-6: Developing Interfaces to Embed into Clinician Workflow

Use Case: Predicting mortality to prompt more serious illness communication



Months 6-12: Implementation and Studying Impact



	Control	Intervention
Chemo last 14 days	10.4%	7.5%
Savings in last month of life	~\$1500	

Parikh et al, JAMA Onc, 2023

Can AI Mitigate Disparities?

	Pre-intervention, %	Post-intervention, %	Absolute Percentage-point Difference
Non-Hispanic White	3.9 (58/1494)	14.2 (201/1417)	10.3
Non-Hispanic Black	3.6 (17/467)	16.9 (69/408)	13.3
Other*	1.2 (2/164)	19.5 (34/408)	18.3

In a trial of a machine learning-based nudge to perform end-of-life conversations, there was a significantly higher impact for non-White minorities

How do we evaluate AI solutions at Winship?

- ✓ Is there a *clinical champion*?
- ✓ Are there *peer cancer centers* using the tool?
- ✓ Has the algorithm been trained on *multi-institutional, representative data*?
- ✓ Is the model *only using “easy” data*?
- ✓ What level of *data sharing* is necessary?
- ✓ Is the AI model **explainable and tailored** to Winship patients?
- ✓ Is the decision that the AI informs *high-risk*, requiring a prospective study?

What does your AI-efficient clinic look like on Monday?



AI pre-screens imaging results, flagging patients who are progressing



Ambient scribing during patient visits



Review AI-generated visit summaries



Complex case decision-support using AI evidence synthesis tool



AI agent “tumor board”



AI-assisted trial matching; prior auth letters



Thank you!

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Q&A
